

Amendments to the Claims

1.(Currently Amended) An apparatus for stimulating production from a hydrocarbon-containing formation in an oil or gas well, the apparatus comprising:

a container sized to be received and supported in the well at a level adjacent the formation;

5 at least one shaped charge supported within the container, the shaped charge adapted when ignited to perforate the formation;

a supply of oxygen-rich material ~~supported within the container and adapted to be introduced explosively into the formation with the shaped charge whereby burning of hydrocarbons therein is promoted,~~
10 ~~wherein the oxygen-rich material is part of~~ in each of the shaped charges and adapted to be propelled into the formation by the explosion of the shaped charge, wherein the oxygen-rich material is not explosively reactive with water and is capable of fueling the burning of hydrocarbons in the formation regardless of the presence of water in
15 the well when the shaped charge is ignited; and

at least one igniter for detonating the shaped charge.

2. (Previously Presented) The apparatus of claim 1 wherein the container is elongated having first and second ends.

3. (Previously Presented) The apparatus of claim 2 wherein the apparatus further comprises a high order primer cord in contact with each of the at least one shaped charge and adapted to be ignited by the igniter.

4. (Original) The apparatus of claim 3 wherein the igniter is an electric igniter.

5. (Original) The apparatus of claim 2 wherein the at least one shaped charge comprises a plurality of shaped charges positioned to perforate different locations in the formation.

6. (Previously Presented) The apparatus of claim 5 wherein the apparatus further comprises a high order primer cord in contact with each of the at least one shaped charge and adapted to be ignited by the igniter.

7. (Original) The apparatus of claim 1 wherein the oxygen-rich material is potassium nitrate.

8. (Original) The apparatus of claim 1 wherein the at least one shaped charge comprises a plurality of shaped charges positioned to perforate different locations in the formation.

9. (Previously Presented) The apparatus of claim 8 wherein the apparatus further comprises a high order primer cord in contact with each of the at least one shaped charge and adapted to be ignited by the igniter.

10. (Original) The apparatus of claim 1 wherein the igniter is an electric igniter.

11. (Original) The apparatus of claim 8 wherein the apparatus further comprises a primer cord in contact with each of the at least one shaped charge.

12. Cancelled.

13. Cancelled.

14. (Withdrawn-Currently Amended) The apparatus of claim [[12]] 1 wherein each of the at least one shaped charge comprises:

a body of explosive formed to have a conical frontal recess;

a detonator adapted to ignite the body of explosive;

5 a liner shaped to line the frontal recess in the body of explosive; and

wherein the oxygen-rich material forms a layer between the liner and the frontal recess of the body of explosive.

15. (Withdrawn-Currently Amended) The apparatus of claim [[12]] 1 wherein each of the at least one shaped charge comprises:

a body of fast burning explosive formed to have a conical frontal recess;

a detonator adapted to ignite the body of fast burning explosive;

5 an insert shaped to conform to and be received in the frontal recess in the body of explosive and to have a planar front, the insert formed of a slow burning explosive; and

a disc-shaped layer of fast burning explosive having a front and a rear, the rear positioned on the planar front of the insert;

10 wherein the oxygen-rich material forms a layer on the front of the layer of fast burning explosive.

16.(Withdrawn-Currently Amended) The apparatus of claim [[12]] 1 wherein each of the at least one shaped charge comprises:

a first body of fast burning explosive formed to have a frontal recess;

a body of oxygen-rich material formed to be received in frontal recess of the first
5 body of explosive and to have a frontal recess with a cylindrical center and
a frusto-conical forward portion;

a second body of fast burning explosive shaped to conform to and be received in
the cylindrical center of the recess in the body of oxygen-rich material and
to have a conical front recess continuous with the frusto-conical forward
10 portion of the frontal recess in the body of oxygen-rich material so that the
frontal recess of the second body of explosive and the frusto-conical
portion of the frontal recess in the oxygen-rich material form a complete
cone;

detonators adapted to ignite the first body of fast burning explosive and the
15 second body of fast burning explosive; and

a conically shaped metal liner positioned inside the complete cone formed by the
frontal recess of the second body of explosive and the frusto-conical
portion of the frontal recess in the oxygen-rich material.

17.(Previously Presented) The apparatus of claim 1 wherein each of the at least
one shaped charge comprises:

a body of fast burning explosive formed to have a stepped frontal recess with a
conical center portion and a frusto-conical forward portion having a
5 narrowest diameter to form a step between the center portion and the
forward portion;

a body of oxygen-rich material formed to be received in frusto-conical forward
portion of the frontal recess of the body of explosive and having a

10 narrowest diameter substantially the same as the widest diameter of the
center portion of the frontal recess of the body of fast burning explosive,
so that the conical center portion of the frontal recess of the body of
explosive and the body of oxygen-rich material form a complete cone;
a detonator adapted to ignite the body of fast burning explosive; and
a conically shaped liner positioned inside the conical center portion of the frontal
15 recess in the body of fast burning explosive.

18.(Currently Amended) A method for stimulating hydrocarbon containing strata
in an oil or gas well, the method comprising:

perforating the formation using a shaped charge; and
explosively introducing an oxygen-rich material into the formation ~~whereby~~
5 ~~burning of the hydrocarbons is promoted~~, wherein the oxygen-rich
material is introduced into the formation by the explosive force of the
shaped charge, and wherein the oxygen-rich material is not explosively
reactive with water and is capable of fueling the burning of
hydrocarbons in the formation regardless of the presence of water in
10 the well when the shaped charge is ignited.

19.(Original) The method of claim 18 wherein the oxygen-rich material is
potassium nitrate.

20.(Original) The method of claim 19 wherein the oxygen-rich material is
introduced into the formation ahead of the jet from the shaped charge.

21.(Withdrawn) The method of claim 19 wherein the oxygen-rich material is introduced into the formation behind the jet from the shaped charge.

22. (Cancelled).

23. (Cancelled).

24.(Withdrawn) The method of claim 18 wherein the oxygen-rich material is introduced into the formation behind the jet from the shaped charge.

25.(Original) The method of claim 18 wherein the oxygen-rich material is introduced into the formation ahead of the jet from the shaped charge.

26.(Currently Amended) An apparatus for stimulating production from a hydrocarbon-containing formation in an oil or gas well, the apparatus comprising:

a container sized to be received and supported in the well at a level adjacent the formation, wherein the container is elongated having first and second

ends;

two end charges of low order explosive material, one positioned at each of the first and second ends of the container;

at least one shaped charge supported within the container between the two end charges, the shaped charge adapted when ignited to perforate the formation;

a supply of oxygen-rich material supported within the container around the shaped charge and adapted to be introduced explosively into the formation with the shaped charge, ~~whereby burning of hydrocarbons therein is~~

promoted, wherein the oxygen-rich material is not explosively reactive with water and is capable of fueling the burning of hydrocarbons in the formation regardless of the presence of water in the well when the shaped charge is ignited; and

at least one igniter for detonating the shaped charge and the end charges.

27.(Previously Presented) The apparatus of claim 26 wherein the apparatus further comprises a high order primer cord in contact with each of the at least one shaped charges and both the end charges and adapted to be ignited by the igniter.

28.(Previously Presented) The apparatus of claim 27 wherein the igniter is an electric igniter.

29.(Previously Presented) The apparatus of claim 26 wherein the at least one shaped charge comprises a plurality of shaped charges positioned to perforate different locations in the formation.

30.(Previously Presented) The apparatus of claim 29 wherein the apparatus further comprises a high order primer cord in contact with each of the at least one shaped charges and both the end charges and adapted to be ignited by the igniter.

31.(Previously Presented) The apparatus of claim 29 wherein the oxygen-rich material is potassium nitrate.

32.(Previously Presented) The apparatus of claim 26 wherein the oxygen-rich material is potassium nitrate.

33.(Previously Presented) The apparatus of claim 32 wherein the apparatus further comprises a high order primer cord in contact with each of the at least one shaped charges and both the end charges and adapted to be ignited by the igniter.

34.(Previously Presented) The apparatus of claim 26 wherein the igniter is an electric igniter.

35.(Previously Presented) The apparatus of claim 34 wherein the at least one shaped charge comprises a plurality of shaped charges positioned to perforate different locations in the formation.

36.(Previously Presented) The apparatus of claim 34 wherein the oxygen-rich material is potassium nitrate.

37.(New) A shaped charge for use in perforating hydrocarbon-containing formations in oil and gas wells, the shaped charge comprising:

a housing;

a body of fast burning explosive in the housing, the front of the body of explosive

defining a rearwardly pointing conical recess;

a detonator adapted to ignite the body of fast burning explosive;

a body of oxygen-rich material in the housing, wherein the oxygen-rich material

is not explosively reactive with water and is capable of fueling the burning of hydrocarbons in the formation; and

whereby the shaped charge is adapted to perforate the formation and the body of oxygen-rich material is adapted to be introduced explosively into the formation with the shaped charge whereby burning of hydrocarbons

therein is promoted regardless of the presence of water in the well when the explosive is ignited.

38.(New) The shaped charge of claim 37 further comprising a liner shaped to line the conical recess in the body of explosive and wherein the oxygen-rich material forms a conically shaped layer between the liner and the body of explosive.

39.(New) The shaped charge of claim 37 further comprising an insert shaped to conform to and be received in the frontal recess in the body of explosive and to have a planar front, the insert formed of a slow burning explosive; and

5 a disc-shaped layer of fast burning explosive having a front and a rear, the rear positioned on the planar front of the insert; wherein the oxygen-rich material forms a layer on the front of the layer of fast burning explosive.

40.(New) The shaped charge of claim 37 wherein the oxygen-rich material is formed to be received in conical recess of the first body of explosive and is shaped to have a frontal recess with a cylindrical center and a frusto-conical forward portion, and wherein the shaped charge further comprises:

5 a second body of fast burning explosive shaped to conform to and be received in the cylindrical center of the recess in the body of oxygen-rich material and to have a conical front recess continuous with the frusto-conical forward portion of the frontal recess in the body of oxygen-rich material so that the frontal recess of the second body of explosive and the frusto-conical

10 portion of the frontal recess in the oxygen-rich material form a complete
 cone;
 a detonator adapted to ignite the second body of fast burning explosive; and
 a liner is positioned inside the complete cone formed by the frontal recess of the
 second body of explosive and the frusto-conical portion of the frontal
15 recess in the oxygen-rich material.

 41.(New) The shaped charge of claim 37 wherein the conical recess in the body
of fast burning explosive has a conical center portion and a frusto-conical forward portion,
wherein the narrowest diameter of the forward portion is greater than the widest diameter of the
center portion to form a step therebetween, where in the shaped charge further comprises a
5 conical liner inside the center portion, and wherein the oxygen-rich material is a frusto-conically
shaped layer received in forward portion so that exposed forward surfaces of the liner and the
oxygen-rich material form a complete cone-shaped recess.